Amendments to the Claims:

1. (Previously presented) A method for detecting an abnormality in a host medium comprising:

illuminating the host medium at a plurality of different positions with frequency-swept modulated signals;

detecting signals following propagation through the host medium and the abnormality within the host medium;

creating a shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region;

illuminating at least that portion of the host medium that contains the suspicious region with frequency-swept modulated signals, following creation of the shadow image, wherein the signals are frequency-swept modulated across a larger range of frequencies during the illumination of the suspicious region than during the initial illumination of the host medium;

detecting the frequency-swept modulated signals following propagation through at least that portion of the host medium that contains the suspicious region; and

characterizing the abnormality based upon the detected frequency-swept modulated signals.

Claims 2-3. (Canceled)

4. (Original) A method according to Claim 1 wherein said initial illumination step comprises illuminating the host medium with signals having at least two different wavelengths.

5. (Original) A method according to Claim 4 wherein said initial detecting step comprises detecting at least an amplitude of the signals following propagation through the host medium and the abnormality within the host medium.

6. (Original) A method according to Claim 5 further comprising forming a ratio of the amplitude of the signals detected during said initial detecting step at each of the different wavelengths.

7. (Original) A method according to Claim 1 wherein said step of illuminating at least that portion of the host medium that contains the suspicious region comprises illuminating at least that portion of the host medium that contains the suspicious region with signals having at least two different wavelengths.

8. (Original) A method according to Claim 7 further comprising a step of determining a P-criteria for at least one of a plurality of positions within at least that portion of the host medium that contains the suspicious region following said second detecting step, wherein the P-criteria is at least partially based upon coefficients of absorptivity for signals having the different wavelengths at the respective position.

9. (Original) A method according to Claim 1 further comprising a step of determining an S_{var}-criteria for at least one of a plurality of positions within at least that portion of the host medium that contains the suspicious region following said second detecting step, wherein the S_{var}-criteria is at least partially based upon a variation in percent concentration of oxygenated hemoglobin between the abnormality and the host medium and a variation in total hemoglobin concentration between the abnormality and the host medium at the respective position.

10. (Currently amended) A method for detecting an abnormality in a host medium comprising:

illuminating the host medium at a plurality of different positions that cover a broad portion of the host medium to facilitate generation of a shadow image;

detecting signals following propagation through the host medium and the abnormality within the host medium;

creating [[a]] the shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region;

illuminating ~~at least~~ that portion of the host medium that contains the suspicious region with frequency-swept modulated signals, following creation of the shadow image, wherein illuminating the suspicious region comprises positioning a light source that is capable of emitting light that propagates in a first direction proximate the suspicious reason but at a position offset from at least one of the suspicious region and a detector in a direction transverse to the first direction;

detecting the frequency-swept modulated signals with the detector following propagation through at least that portion of the host medium that contains the suspicious region; and

characterizing the abnormality based upon the detected frequency-swept modulated signals.

11. (Previously presented) A method according to Claim 10 wherein said second detecting step comprises one of moving a detector through a plurality of positions including at least one position aligned with the suspicious region and moving a detector along a linear path displaced from the suspicious region.

12. (Previously presented) A method for detecting an abnormality in a host medium comprising:

illuminating the host medium at a plurality of different positions;

detecting signals following propagation through the host medium and the abnormality within the host medium;

creating a shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region;

illuminating at least that portion of the host medium that contains the suspicious region with frequency-swept modulated signals, following creation of the shadow image;

detecting the frequency-swept modulated signals following propagation through at least that portion of the host medium that contains the suspicious region; and

characterizing the abnormality based upon the detected frequency-swept modulated signals,

wherein said second illuminating and detecting steps comprise:

positioning a light source and a detector on opposite sides of the host medium in an offset relation and out of alignment with one another; and

moving the light source and the detector in tandem such that the offset relation is maintained.

13. (Original) A method according to Claim 1 further comprising:

illuminating a portion of the host medium at a plurality of different positions displaced from the suspicious region with signals having at least two different wavelengths;

detecting the signals following propagation through the host medium; and

determining a reference scattering coefficient and a reference absorption coefficient for the host medium based upon the detected signals.

14. (Previously presented) A method according to Claim 13 further comprising determining an absorption coefficient and a size of the abnormality based on setting a scattering coefficient of the abnormality equal to the reference scattering coefficient and further based upon the frequency-swept modulated signals that are detected following propagation through at least that portion of the host medium that contains the suspicious region.

15. (Original) A method according to Claim 14 further comprising determining a location of the abnormality within the host medium following said second detecting step.

16. (Original) A method according to Claim 1 wherein the host medium is a breast, and wherein the method further comprises compressing the breast between a pair of plates prior to said initial illumination step.

17. (Original) A method according to Claim 1 wherein the host medium is a breast, and wherein the method further comprises applying oil to the breast prior to said initial illumination step.

18. (Previously presented) An apparatus for detecting an abnormality in a host medium comprising:

a light source for generating signals that propagate in a first direction and illuminate the host medium at a plurality of different positions;

a modulator for applying frequency-swept modulation to the signals generated by said light source prior to illuminating the host medium;

a detector for detecting signals following propagation through the host medium and the abnormality within the host medium;

a display for presenting a shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region; and

a positioner for positioning said light source relative to the host medium such that said light source illuminates the host medium at the plurality of different positions, wherein said positioner initially positions said light source at a plurality of different positions that cover a broad portion of the host medium to facilitate generation of the shadow image, and wherein said positioner subsequently positions said light source proximate that portion of the host medium that includes the suspicious region, following generation of the shadow image, to facilitate characterization of the abnormality,

wherein said positioner also positions said detector relative to the host medium, and wherein said positioner is capable of positioning said light source proximate the suspicious

region but in an offset relation in a direction transverse to the first direction from one of said detector and the suspicious region.

19. (Previously presented) An apparatus according to Claim 18 wherein said positioner maintains said light source and said detector in alignment while initially positioning said light source and said detector at a plurality of different positions that cover a broad portion of the host medium to facilitate generation of the shadow image.

20. (Original) An apparatus according to Claim 18 wherein said positioner comprises at least two X-Y linear motorized stages.

21. (Original) An apparatus according to Claim 18 wherein said modulator comprises a frequency-swept network analyzer.

22. (Original) An apparatus according to Claim 18 wherein the host medium is a breast, and wherein the apparatus further comprises a pair of plates separated by a distance sufficient to receive the breast of a patient.

23. (Original) An apparatus according to Claim 22 further comprising an adjustable belt extending between said plates proximate the breast, said adjustable belt capable of being tightened about the breast such that the breast fills a region defined by said pair of plates and said adjustable belt, thereby facilitating imaging of the breast.

24. (Original) An apparatus according to Claim 22 further comprising an opaque material that fills a region defined by said plates that is unfilled by the breast.

25. (Original) An apparatus according to Claim 24 further comprising a background light source for illuminating any regions of separation between said opaque material and the breast.

26. (Original) An apparatus according to Claim 22 further comprising a separation detector for measuring the distance by which said pair of plates are separated.

27. (Original) An apparatus according to Claim 18 wherein said detector is a photomultiplier tube.

28. (Original) An apparatus according to Claim 18 further comprising a diaphragm for selectively controlling an intensity of light that is presented to said detector.

29. (Original) An apparatus according to Claim 18 wherein said light source comprises a first fiber optic pigtail infrared diode laser capable of emitting signals having a power level of between 100 milliwatts and 500 milliwatts and a wavelength of between 810 nanometers and 840 nanometers.

30. (Original) An apparatus according to Claim 29 wherein said light source comprises a second fiber optic pigtail infrared diode laser capable of emitting signals having a power level of between 100 milliwatts and 500 milliwatts and a wavelength of between 670 nanometers and 700 nanometers.

31. (Original) An apparatus according to Claim 18 further comprising:

a reference light source for also illuminating the host medium with reference signals;

a reference detector for detecting the reference signals following propagation through the host medium and the abnormality within the host medium; and

a shutter for preventing further detection by said detector if said reference detector detects that an amplitude of the reference signals exceeds a predetermined threshold.

32. (Original) An apparatus according to Claim 31 wherein said reference light source comprises a fiber optic pigtail diode laser operating in a continuous wave mode and capable of emitting signals having a wavelength of between 950 nanometers and 980 nanometers.

Claims 33-47 (Canceled).